

# Experiments in electric system and power train system for automobiles

Syllabus Number

1L204

Basic Major Subjects

Elective Requisites 2 credit

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## 1. Course Description

The following contents will be learned.

- (1) Frequency characteristics of analog and digital signals, functions of measuring equipment (oscilloscopes, function generators and circuit testers) and handling in evaluation tests.
  - (2) Functions, principles, and structures related to the starting equipment, charging equipment, ignition equipment for automobiles.
  - (3) Function, principle, and structure of manual transmission and clutch and differential gear in power train system for automobiles.
- In this lesson, knowledge, techniques, and attitudes regarding DP2, DP3, DP4 and DP5 will be acquired. Lessons are primarily experiment and practice style.

## 2. Course Objectives

Students understand the basics of the frequency characteristics of analog and digital signals, and then apply the functions of measuring instruments (oscilloscopes, function generators, and circuit testers) appropriately. Students understand the functions, principles and structures of electric system (starting equipment, charging equipment, ignition equipment) and power train system (manual transmission, clutch, differential gear) for automobiles.

## 3. Grading Policy

The grade evaluation is based on 50% of the reports for the 1st to 4th lessons and 50% of the exam results for the 5th to 14th lessons, but it will be evaluated by deducting the attitude in the lessons. The lessons attitude is to be able to observe the "safety instructions in the first lessons, and the instructions on clothes and other matters in the practical training". The report will be submitted in the specified date. The exam will be held in the 15th lessons and will be explained after the exam.

## 4. Textbook and Reference

### Textbook

Textbook editorial committee of the Japan Automobile Service Promotion Association (Supervised by the Ministry of Land, Infrastructure, Transport and Tourism Road Transport Bureau) Third grade automobile chassis Japan Automobile Service Promotion Association (JASPA)  
Textbook editorial committee of the Japan Automobile Maintenance Colleges Association (Recommended by the Ministry of Land, Infrastructure, Transport and Tourism Road Transport Bureau) Electric component structure Japan Automobile Maintenance Colleges Association (JAMCA)

## 5. Requirements (Assignments)

- (1) As preparations for next lesson, please check the meaning of the proper noun and the contents of the relationship shown in the contents of the lesson, and come to the class. (90 minutes)
- (2) As a review, please prepare a report on the items instructed during the lesson, so that you can explain them in the next lesson. (90 minutes)

## 6. Note

In the 5th to 14th lessons, students will be dressed in practical training in accordance with the "Instructions on Safety, Clothing in Training" in the first class. Therefore, students who register for courses should prepare their own clothes and other items by the end of the fourth class.

## 7. Schedule

- [1] About safety precautions, instructions on clothes in practical training, and procedures for purchasing textbooks.  
Functions and handling of oscilloscope, function generator and circuit tester of measuring equipment used in experiments.
- [2] Experiment on superimposition effect using oscilloscope and function generator.  
Wheatstone's bridge.
- [3] Experiment on frequency characteristics (sine wave) of analog signal.  
Experiment on frequency characteristics (square wave) of digital signal.
- [4] Experiment on frequency characteristics (square wave) of digital signal.  
Fast Fourier Transform.
- [5] Practice of disassembly and assembly on the function and principles of the starting equipment for automobiles, and the structure and operation.
- [6] Practice of disassembly and assembly on the function and principles of the charging equipment for automobiles, and the structure and operation.
- [7] Practice of disassembly and assembly on the function and principles of the ignition equipment for automobiles, and the structure and operation.
- [8] Practice of disassembly and assembly on the function and principles of the manual transmission in power train system for automobiles.
- [9] Practice of disassembly and assembly on the structure of the manual transmission in power train system for automobiles.
- [10] Practice of disassembly and assembly on the operation of the manual transmission in power train system for automobiles.

- [11] Practice of disassembly and assembly on the function and principles of the clutch in power train system for automobiles, and the structure.
- [12] Practice of disassembly and assembly on the operation of the clutch in power train system for automobiles.
- [13] Practice of disassembly and assembly on the function and principles of the differential gear in power train system for automobiles, and the structure.
- [14] Practice of disassembly and assembly on the operation of the differential gear in power train system for automobiles.
- [15] Final exam and summary.